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FM AMEMBASSY BRASILIA
TO RUEHC/SECSTATE WASHDC 2069
INFO RUEHZN/ENVIRONMENT SCIENCE AND TECHNOLOGY COLLECTIVE
RUEHDS/AMEMBASSY ADDIS ABABA 0327
RUEHAM/AMEMBASSY AMMAN 0346
RUEHBK/AMEMBASSY BANGKOK 0502
RUEHUP/AMEMBASSY BUDAPEST 0320
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RUEHSO/AMCONSUL SAO PAULO 2386
RUEHRI/AMCONSUL RIO DE JANEIRO 6385
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RUEHC/DOI WASHDC
RUEAWJA/DOJ WASHDC
RUEAEPA/HQ EPA WASHDC
RUEANAT/NASA HQ WASHDC
RUCPDC/NOAA WASHDC
RUMIAAA/USCINCSO MIAMI FL
RUEHRC/USDA WASHDC
RUCPDOC/USDOC WASHDC

UNCLAS SECTION 01 OF 09 BRASILIA 000922

SIPDIS

DEPT PASS USAID LAC/RSD,LAC/SAM,G/ENV,PPC/ENV
TREASURY FOR USED IBRD AND IDB AND INTL/MDB
USDA FOR FOREST SERVICE: LIZ MAHEW
USDA FOR FOREIGN AGRICULTURE SERVICE:CJACKSON
INTERIOR FOR DIR INT AFFAIRS: KWASHBURN
INTERIOR FOR FWS: TOM RILEY
INTERIOR FOR NPS: JONATHAN PUTNAM
INTERIOR PASS USGS FOR INTERNATIONAL:JWEAVER
JUSTICE, ENVIRONMENT NATURAL RESOURCES:JWEBB
EPA FOR INTERNATIONAL: CAM HILL-MACON
USDA FOR ARS/INTERNATIONAL RESEARCH: GFLANLEY
NSF FOR INTERNATIONAL: HAROLD STOLBERG

E.O. 12958: N/A
TAGS: SENV EAGR EAID TBIO ECON XR BR
SUBJECT: AMAZON FOREST STRESSED BY FIRE AND CLIMATE CHANGE

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¶1. SUMMARY. This is the second in a two-part series addressing the impacts of climate change and fire (Part 2), and agricultural expansion and infrastructure integration (Part 1) on Amazon rainforest vulnerability and conservation. Most climate change models predict a 21st century warming and drying trend for the southern Amazon basin. In combination with forest fragmentation, this warming trend will create a feedback loop of increasing forest vulnerability to fire, drought, and continued climate change. Researchers predict that Amazon rainforest vulnerability is approaching an ecological "tipping point" that could result in a climate-driven transition from rainforests to savannah and semi-arid

vegetation. However, collaborative, Amazon basin governance efforts could reduce forest degradation via regional fire prevention strategies to prevent and control undesirable fires, creation of protected areas in the path of expanding agricultural frontiers, and creation of market mechanisms to balance drivers of extractive deforestation. END SUMMARY.

INFLUENCE OF CLIMATE CHANGE ON FOREST RESILIENCE

¶2. While there is variation among climate change models predicting the future of the Amazon rainforest, the highly-regarded Hadley Centre model (HadCM3LC) simulations indicate that the 21st century will bring increased Amazon warming and dryness, particularly southern parts of the Amazon rainforest. HadCM3LC, a fully coupled land-atmosphere global climate model incorporating plant physiology and photosynthetic response, further suggests that future decades will bring a climate-driven substitution of forests by savannah and semi-arid vegetation, described as an Amazon forest 'dieback', a term originally coined by Carlos Nobre, of the Brazilian Institute for Space Research (INPE). Regions predicted to be most affected by climate change and reduced precipitation include: the eastern, southeastern, and southwestern Amazon basin, in particular the tri-border region with Brazil, Bolivia, and Peru. The northwest Amazon basin (Colombia, Ecuador, and northern Peru) is likely to maintain high rainfall levels owing to the collision (rise and condensation) of trade winds with the north central Andean chain.

¶3. Climate models such as HadCM3LC do not however, account for the effects of rapid land-use change, fire-induced forest degradation, and current localized Amazon rainforest climate change. The synergistic factors of deforestation, forest fragmentation, fire,

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and regional climate change suggest that the Amazon biome in the 21st century may be even more vulnerable than climate models predict, according to Daniel Nepstad (formerly Woods Hole Research Center, currently Moore Foundation) and colleagues. NOTE: A biome is defined as a regional ecological community characterized by distinctive plant and animal species. END NOTE.

¶4. Recent research by Sampaio and Nobre (INPE) indicates that land clearing (including land conversion for agricultural use) that exceeds 30 percent of regional forest area may cause declining precipitation, resulting in a positive feedback loop that exacerbates forest drying and increases forest susceptibility to further degradation. On the shortest time scale, fire may also inhibit regional rainfall by liberating particulate matter into the atmosphere, disrupting natural condensation and precipitation patterns.

DROUGHT AND FIRE AS DRIVERS OF FOREST DEGRADATION

¶5. With climate models indicating increased air temperatures and decreased precipitation over the Amazon forest, droughts of greater frequency, duration, and intensity are predicted. Such droughts increase forest vulnerability by decreasing water uptake and increasing the quantity of dry organic material that fuels fires,

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often pushing forests over a flammability threshold, and creating conditions that lead to more intense and severe fires. Recent experiences with regional drought point to the 2005 season in the southwestern Amazon basin(Bolivia-Brazil-Peru MAP region), that resulted in the burning of over 300,000 hectares of normally fire-resistant primary forest due to anthropogenic (human-set) fires. Over US$50 million in direct economic losses were reported in the region. NOTE: If these forests are allowed to recuperate naturally, portions of the burnt forest may recover, reducing net losses. END NOTE.

¶6. Most of the forests in the Amazon basin maintain full leaf canopies during dry seasons of three to five months, indicating a high tolerance to regularly occurring short-term droughts. After three or more years of intermittent drought, however, forest structure begins to breakdown and even large trees begin to die. Although the response of forests to prolonged drought has the potential to be slow and gradual, the dynamics of resistance are fundamentally altered when fire and other disturbances (i.e., insects, disease, wind) are brought into the equation. In particular, the intensive use of fire in preparing land for agriculture (and the leakage of fire into surrounding forests), threatens to push the region through a 'tipping point', transitioning the vegetation to a more rapidly degraded scrub

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system, according to Nepstad and colleagues. NOTE: Although slash-and-burn fire setting has been a traditional indigenous agricultural practice for centuries, broader industrial-scale burning, in combination with a drier climate, poses a greater risk to forest health than historically recorded. END NOTE.

¶7. Beyond regional climate change, Amazon basin land-use changes from agricultural and infrastructure expansion (Part 1 of this series) also contribute to increased forest fire susceptibility via three primary mechanisms: forest fragmentation, selective timber harvesting, and increase of ignition sources. Fragmented forests are highly fire vulnerable due to the creation of drier conditions along forest edges and the rapid growth of grasses, ferns, bamboo, lianas, and flammable tree species. Uncontrolled selective logging,

which can damage up to 50 percent of the leaf canopy, also increases forest fire susceptibility. When a tree (old growth) dies, a canopy gap is created, allowing penetration of sunlight that acts to warm and dry the forest floor. Tree mortality can be an initial step that triggers a process of further forest degradation.

¶8. In modern times, fire has played a significant role in shaping the forest structure and composition of tropical ecosystems. Most tropical rainforest trees are poorly adapted to fire stress; even low-intensity wildfires can lead to unusually high levels of tree

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mortality. In fact, under conditions of moderate climate change (warmer and drier conditions) fire is considered a stronger driver of forest change than long-term drought stress. Fire-induced forest alterations can drastically change forests by selecting for a suite of fast-growing pioneer species that mimic a young second-growth forest stand. The post-fire, second-growth forest stand offers profound reductions in ecosystem services such as water and nutrient cycling, as well as carbon sequestration, owing to the fact that these pioneer species accrue a lower biomass (store less carbon).

REGIONAL ACTIONS TO REDUCE FOREST VULNERABILITY AND "TIPPING POINT" RESPONSE

¶9. In regions throughout the Amazon biome, sustainable forest management (an economic alternative to land conversion for agricultural use) and integrated fire management represent growing priorities for the Amazon rainforest in terms of forest and habitat conservation, biodiversity protection, and reduction in greenhouse gas emissions. COMMENT: Brazil, ranked among the top five greenhouse gas emitters worldwide, is particularly motivated to reduce the incidence of Amazon rainforest fire. Currently 75 percent of Brazil's gas emissions are attributed to deforestation and forest fires. END COMMENT.

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¶10. Several actions offer opportunities to conserve Amazon rainforest by slowing the pace of land conversion, forest

degradation, and dieback:

-- Promoting sound land stewardship among landholders and compliance with environmental legislation; promoting responsible sourcing of key Amazon commodities including timber, soy, sugar cane, and palm oil; specifically promoting low-impact timber harvesting and forest certification. (Such compliance is necessary for participation in commodity markets and for access to financing.) NOTE: Bolivia, with a much smaller portion of Amazon biome land area, has more certified forest than Brazil. END NOTE.

-- Restricting the advance of cattle ranching and industrial agriculture into the Amazon biome. (Roughly one-quarter of previously forested lands in the Brazilian Amazon biome are in some stage of abandonment; most are degraded cattle pastures.)

-- Adopting an integrated fire management strategy for the Pan-Amazon basin region that will reduce the use of fire as a land management tool, reduce the environmental effects of fire use, and promote investment in fire prevention and control, and in land restoration. NOTE: recent basin-wide initiatives have met resistance in Brazil due to concerns over sovereignty and a perceived foreign

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management of natural resources. END NOTE.

-- Protecting areas in the pathway of the expanding agricultural frontier via a multiple-stakeholder, participatory regional planning processes. NOTE: Ecosystem integrity is best maintained via large protected areas rather than a patchwork quilt of non-contiguous areas. END NOTE.
-- Creating economic incentives to promote preservation and restoration of abandoned Amazon forest land, and to reward reductions in greenhouse gas emissions related to deforestation and agricultural fires.

¶11. Integrated forest fire management (prevention, control, incident-response, and managed fire use) may play an important role in maintaining the integrity of the Amazon biome. For Brazil in particular, fire reduction is a critical step in reducing national greenhouse gas emissions. Research by Nepstad and colleagues suggests that during periods of drought, simple forest conservation and elimination of direct deforestation may not be sufficient; active forest fire management, prevention and control may also be needed, as was pioneered in the Brazilian states of Mato Grosso in 2002 and Acre during the drought of 2005, when national, state, and municipal efforts were coordinated to deploy authorities and fire fighting units.

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NEED FOR INTEGRATED FOREST FIRE MANAGEMENT

¶12. A missing element in the current development model for the Amazon rainforest is adequate agricultural and forestry extension assistance and community provision of information on land use, fire management, and seasonal weather patterns. Amazon regions with high migrant populations also have extremely high turnover rates among farmers and ranchers. Newcomers to the region lack nuanced understandings of the local climate, ecosystem, agricultural practices, and sustainable forestry methods, exacerbating the vulnerability of their lands to extreme weather events, droughts, and flooding.

¶13. Opportunities are ripe for USG collaboration on integrated fire management themes including: development of fire management strategies and policies for the Amazon basin, capacity building and interagency coordination, remote monitoring, incident command training, fire prevention and management, management of slash and burn, ecosystem restoration, and environmental education.

¶14. The US Forest Service and the US Office of Foreign Disaster Assistance (OFDA) have long histories of collaboration and capacity building in the Amazon basin region, touching on themes including:

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integrated forest fire management, remote monitoring, fire prevention, and forest fire fighting.

¶15. This cable was coordinated and cleared with Embassies in Lima, La Paz, Quito, and Bogota, and USAID and USFS in Washington.

SOBEL